

- 1 1. A purified and isolated DNA molecule consisting essentially of the nucleotide sequence
2 set forth in SEQ ID NO:1, or its complementary strand.
- 1 2. The purified and isolated DNA molecule of Claim 1, wherein said DNA molecule
2 encodes for a purified and isolated protein molecule consisting essentially of the amino acid
3 sequence set forth in SEQ ID NO:2.
- 1 3. A live, attenuated strain of *V.anguillarum* which comprises:
2 a mutated *mugA* gene, the strain characterized in that it is incapable of expressing a
3 functional *mugA* protein.
- 1 4. The live, attenuated strain according to claim 3 wherein the strain is incapable of growing
2 in salmon intestinal mucus.
- 1 5. The live, attenuated strain according to claim 3 wherein the mutation is non-revertible.
- 1 6. The live, attenuated strain according to claim 4 wherein the mutation is an insertion.
- 1 7. The live, attenuated strain according to claim 4 wherein the mutation is a deletion.
- 1 8. A vaccine strain against *V.anguillarum* infection in an animal comprising:
2 a live, attenuated strain of *V.anguillarum*, the strain comprised of a mutated *mugA* gene,
3 the strain characterized in that it is incapable of expressing a functional *mugA* protein.
- 1 9. The vaccine strain according to claim 8 wherein the strain further comprises a
2 pharmaceutically acceptable carrier.

- 1 10. The vaccine strain according to claim 8 wherein the animal is a fish.
- 1 11. The vaccine strain according to claim 8 wherein the animal is a bivalve.
- 1 12. The vaccine strain according to claim 8 wherein the animal is a crustacean.
- 1 13. The vaccine strain according to claim 8 wherein the mutation is non-revertible.
- 1 14. The vaccine strain according to claim 13 wherein the mutation is an insertion.
- 1 15. The vaccine strain according to claim 13 wherein the mutation is a deletion.
- 1 16. A method for immunizing an animal against *V. anguillarum* infection in an animal which
2 comprises:
3 administering to the animal a vaccine comprised of a live, attenuated strain of
4 *V. anguillarum*, the strain comprised of a mutated *mugA* gene, the strain characterized in that it is
5 incapable of expressing a functional *mugA* protein as a result of the mutation in the *mugA* gene.
- 1 17. The method according to claim 16 wherein administering comprises immersion.
- 1 18. The method according to claim 16 wherein administering comprises intraperitoneal
2 injection.
- 1 19. The method according to claim 16 wherein administering comprises oral intubation.
- 2 20. The method according to claim 16 wherein administering comprises anal intubation.

- 1 21. The method according to claim 16 wherein administering comprising immersing the
2 animal in a medium containing the attenuated strain.
- 1 22. The method according to claim 16 wherein the animal is a fish.
- 1 23. The method according to claim 16 wherein the animal is a bivalve.
- 1 24. The method according to claim 16 wherein the animal is a crustacean.
- 1 25. The method according to claim 16 wherein the mutation in the *mugA* gene is non-
2 revertible.
- 1 26. The method according to claim 25 wherein the mutation in the *mugA* gene is an insertion.
- 1 27. The method according to claim 25 wherein the mutation in the *mugA* gene is a deletion.
- 1 28. A method of inducing an immune response in an animal against one or more pathogens
2 which comprises transforming a live, attenuated strain of *V. anguillarum*, the strain characterized
3 in that it is incapable of expressing a functional *mugA* protein, with a plasmid comprising DNA
4 of interest encoding at least one protein antigen for each of the pathogens and administering the
5 transformed strain to an animal.
- 1 29. A method for the detection of the presence of *V. anguillarum* in animal tissue or fluids
2 comprising:
3 contacting the sample with a detectably labeled DNA probe wherein the probe comprises
4 a detectable single-stranded DNA having a nucleotide sequence which specifically and

5 selectively hybridizes with DNA of *V. anguillarum* , the DNA probe comprising a nucleotide
6 sequence selected from the group consisting of SEQ ID NO. 1, whereby the presence of the
7 DNA is indicative of a *V. anguillarum* infection.